

9. If we accept the theory that acne is due to an infection, this study would indicate that the infection is little influenced by systemic conditions.

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DISCUSSION

ERNEST DWIGHT CHIPMAN, M. D. (350 Post Street, San Francisco).—This excellent statistical presentation should do much to clear the atmosphere which has so persistently obscured the question of acne. One is reminded of the young man who left the home farm and wandered for many years in a vain hunt for fortune, only to find it in his own back yard when he returned. We in medicine, likewise, often go too far afield in search for that which lies near at hand.

The authors seem to assume that the acne bacillus is the exciting cause of acne and concern themselves with a consideration of possible contributing factors. Now the acne bacillus has never been proved to be the cause of acne, but fortunately, so far as treatment is concerned, its presence, whether causal or casual, does not appear to make any difference.

Reduced to lowest terms the situation seems to me about as follows. First of all, we are dealing with an adolescent with an oily skin. It is quite possible that endocrine influences have a bearing upon the oiliness, but no matter what causes it the excessive production or deficient distribution of oil is always the basis of a juvenile acne. It is, perhaps, quite rational to regard a certain degree of oiliness as a physiologic concomitant of adolescence and to look upon an excess as possibly pathologic.

Our problem is to facilitate the distribution or to lower the production rate of oil, since the retention of oil is the cause of the comedone and the comedone is the essential element of acne. We can help the distribution by the use of keratolytics and by thorough washings with soap and water. We can diminish the production rate of oil with x-rays.

In my observation both the original comedone formation and the secondary infection are often due to dirt. The average adolescent boy, from no matter what social sphere, is entirely undependable in the matter of ablutions, while the average adolescent female is much more handy with the compact than the cake of soap.

I cannot escape the feeling that, had the authors included a table separating those who use soap freely from those who do not, they would have had a positive finding. At any rate this paper should be of great service in keeping etiologic fortune hunters in their own yards.

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NORMAN N. EPSTEIN, M. D. (Four Fifty Sutter Building, San Francisco).—There is little that one can add to the clear-cut statistical report concerning acne vulgaris among the young women attending the University of California, presented by the authors. They have had an excellent opportunity to compare the findings in a large group suffering with acne as compared with a large number who were free of acne lesions.

The striking similarity between the findings of the normal group and the group with acne is outstanding. In no single instance could it be definitely stated that some underlying constitutional disease predisposed to acne. From this, one cannot draw the conclusion that the general health is not important in the production of acne. Many patients have a definite history of exacerbation of their condition at the time of the menstrual period or when they are constipated or after overindulgence in candies and pastries. However, it is true that local treatment frequently is sufficient to completely eradicate the condition.

Acne vulgaris is one of the most common conditions which we have to treat. Although satisfactory results are obtained in the large majority of instances by our present methods of treatment, many cases are

very troublesome. Any work such as this which increases our knowledge of the disease is certainly very much worth while.

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STANLEY O. CHAMBERS, M. D. (1260 Roosevelt Building, Los Angeles).—That the authors have effectively grasped an investigative opportunity is evident in this inclusive statistical review of acne vulgaris.

It is true that a few workers believe the acne bacillus to be the actual cause of the disease. The majority, however, do not accept this view, and it will require much more evidence before such proof is forthcoming. The association between the development of the acne lesion and the endocrine system, so frequently observed by the authors, to my mind stands as the real investigative approach to the disease. We thoroughly understand the pathologic mechanism by which the lesions develop, but we fail in the explanation of that which initiates this abnormal function.

Thyroid dysfunction is sufficiently concrete in its association with the disease to appear outstanding in such a statistical review. If the entire endocrine system was equally accessible to investigative study, we might better understand this basic mechanism.

It is such comprehensive reviews as presented by these authors that stimulate further study and help strengthen our theoretical conceptions.

SENSITIZATION IN SINUS DISEASE*

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DISCUSSION by William Palmer Lucas, M. D., San Francisco; J. A. Bacher, M. D., San Francisco.

RHINOLOGISTS agree that inflammatory affections of the nasal sinuses are in most instances bacterial in origin. Although the normal nasal chambers contain bacteria at all times, a healthy membrane can withstand invasion until some influence affects its powers of defense or lowers the general resistance of the body.

CAUSES OF SINUS DISEASE

There are a number of local causes which predispose to infection of the sinuses. Those most commonly mentioned by rhinologists are congenital or acquired nasal anomalies, foci of infection in the tonsils and teeth, and foreign bodies. Another very important cause of sinus disease is sensitization of the nasal mucous membranes to protein substances. This predisposing influence, although not infrequently mentioned of late in rhinologic literature, has not gained sufficiently the wide recognition to make it a factor in the management of these patients.

The air continually drawn through the nostrils contains not only bacteria, but the nasal mucous membrane provides contact by inhalation with substances in the form of dust. By far, the largest group of dust substances occurs with definite seasonal relation and is made up of various pollens. When the symptoms are perennial the cause may be in the form of air-borne substances, as dust, animal emanations, and vegetable powders, such as orris root, and wheat flour. Dusts play a very important part in causing nasal allergic reactions. House dust is composed princi-

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pally of particles of lint from cotton, materials from linen and wool used in floor coverings, bedding and clothing and many other substances such as glue from furniture, dander and hair of pet animals and bits of down or feathers from upholstering or pillows. Similarly occupational dusts contain the substances characteristic of the shop or factory from which they were obtained: bakery dust is chiefly wheat or rye flour; furrier's dust contains many fur particles and dye substances; and jeweler's dust contains a large percentage of box wood.

Although Eyer mann¹ and other recent observers have shown that hypersensitive individuals may have nasal allergic reactions from the ingestion of foods to which they are sensitive, it is at present generally conceded that inhalants play by far the greatest rôle as sensitizing agents. Some years ago, Cooke,² whose experience with human sensitization is large, pointed out that in his series of over three hundred patients studied, about 70 per cent were due to substances that are conveyed in the form of dust and that act after absorption by the mucous membranes of the respiratory tract.

PREDISPOSITION TO SENSITIZATION

The number of individuals who have a predisposition to become sensitized is large. It has been estimated that from seven to ten per cent of the population of the United States, or approximately from seven to ten million persons, suffer from some allergic disease. Of these some one or two million have hay fever. Whereas it is possible that perfectly normal individuals may, by sufficiently long contact, occupational or otherwise, with powerful sensitizing substances of various kinds, acquire some form of nasal allergy, recent clinical studies have stressed the importance of hereditary predisposition in the development of nasal and other forms of allergic manifestations. Our present knowledge of this inherited tendency does not permit of a definite explanation for the development of this sensitivity more readily in certain individuals than in others. It is believed that the body cells of persons with an inherited predisposition possess this characteristic just as certain individuals inherit eyes and hair of a certain color. The fundamental inheritance transmitted from parents to offspring is not this or that particular form of sensitization, but the allergic constitution. It is difficult in the present state of our knowledge to define in terms of biologic changes in what way an individual with an allergic constitution differs from a normal person. Some of the characteristics of the allergic state which have been stressed by various students of this subject are hyperexcitability of the sympathetic nervous system and increased permeability of the skin and mucous membranes. This increased vulnerability of the skin and mucous membranes may offer an explanation for the readiness with which certain individuals become sensitized to allergic substances, which produce little or no effect upon the normal person.

THE RÔLE OF INFECTION AND SENSITIZATION IN SINUS DISEASE

It has long been recognized by rhinologists that infection of the maxillary, and more particularly of the ethmoid group of sinuses, may give rise to a train of symptoms resembling hay fever. In these patients the nasal discharge may be watery at first, but sooner or later becomes mucopurulent or purulent. This change in the nature of the nasal discharge may be the first indication that the infection of the sinus membranes is primary and not grafted on an allergic condition. The development of the conception that a similar train of symptoms may be the result of a secondary infection of the nasal and sinus mucous membranes, showing allergic manifestations is quite new. It is of historical interest that Todd³ was among the first to emphasize this causal relationship between nasal allergy and chronic sinus infection in a paper entitled "Ethmoiditis as a Common Sequel (Never the Cause) of Pollinosis (Hay Fever)." Of this relationship he writes: "During each attack of hay fever, swelling of the turbinates takes place, causing defective drainage; secretion occurs, infection is added thereto and we have present during pollinosis, ethmoiditis and sometimes pansinusitis. The recovery of the sinusitis usually occurs when the pollen ceases to circulate in the air, but repeated attacks of pollinosis may result in a persistent lesion and thus the patient may develop chronic ethmoiditis, sphenoiditis, frontal sinusitis or pansinusitis, often accompanied by persistent swelling of the turbinates, and especially the middle turbinate."

During the eighteen years since the publication of Todd's paper considerable controversy has arisen between allergists and rhinologists in regard to the relative importance of infection and sensitization in the etiology of chronic sinus disease. Whereas many rhinologists accept the view of Todd that the nasal allergic state may be the primary cause of sinus infection, there are other excellent observers, among them Coates,⁴ who are equally strong in the conviction that infection in many instances is the primary cause of obstruction to sinus drainage and that the allergic state, if it can be shown to exist, may be readily established in the presence of congested and irritable mucous membranes, so common in patients with paranasal sinus disease.

The majority of rhinologists today recognize the importance of both infection and allergy in the etiology of sinus disease. They classify disease of the sinuses into suppurative, hyperplastic, and a mixed group in which the allergic form is placed. Support for this viewpoint is to be obtained both from clinical observation and histopathologic studies of tissues removed from local lesions. Anyone who has observed many patients with some form of nasal allergy must have been impressed with the large incidence of sinus infection among them. This is particularly true of those showing symptoms throughout the year. In them the chronic edema of the nasal mucous membranes soon leads to hyperplasia of the soft tissues—especially around the middle turbinate—

and thickening of the mucosa about the ostia sufficient to narrow the normal opening. Impairment in drainage soon results in chronic sinus infection. The incidence of sinus disease secondary to nasal allergy would appear to be considerable. Of five hundred hay fever patients studied by Duke,⁵ 27 per cent of the perennial cases and six per cent of the seasonal cases, a total of 33 per cent, showed definite evidence of chronic nasal sinus infection. During the past three years we have studied a fairly large number of hay fever patients, both seasonal and nonseasonal, in the asthma and allergy clinic of Stanford Medical School, and whereas no accurate statistical data are as yet available, a conservative estimate of the occurrence of some grade of sinus disease among these patients would be about 50 per cent. These patients were studied with the coöperation of a member of the rhinological staff assigned by the department to make these examinations, which included all the usual methods of study, roentgen rays, and, in many instances, a cytological examination of the aspirated secretion.

Further support for the recognition of allergic sinus disease as a clinical entity comes from the histopathologic studies of Hansel.⁶ In the tissues removed from the nose and sinuses of patients manifesting the clinical symptoms of nasal allergy uncomplicated by secondary infection, this observer found definite histopathologic changes: in the epithelium, thickening, hyperplasia, and polypoid degeneration; in the submucosa, eosinophilic infiltration, edema, and varying numbers of mononuclear, lymphocytic and connective tissue cells. The glands of the submucosa were found compressed and atrophic and the blood vessels dilated, thickened and compressed. In the bone there was evidence of a hyperplastic and atrophic change.

With the advent of secondary infection, Hansel found the microscopic picture modified by the appearance of varying degrees of infiltration with polymorphonuclear leukocytes, lymphocytes, plasma cells and round cells. This increased infiltration of the epithelium and submucosa with polymorphonuclear and other cells may greatly obscure the prominence of the eosinophil. Following long-continued infection, infiltration with connective tissue occurs, a histologic picture which is indistinguishable from that of true primary sinus suppuration. In the stage of fibrosis it may be difficult to distinguish, pathologically, instances of primary sinus suppuration in which bacteria are the causative agents from allergic sinus disease complicated by secondary infection, unless it is possible to find, histologically, areas of edema and hyperplasia without infiltrative changes. Such telltale areas are usually to be found. If corroborative studies confirm Hansel's contention that allergic sinus disease gives rise to a distinct histopathologic picture, we shall have another valuable way of differentiating this form, even when complicated by secondary infection from primary suppurative disease of the sinuses.

DIAGNOSIS OF SINUS DISEASE OF ALLERGIC ORIGIN

The data required for a diagnosis of allergic sinus disease are the same as those essential for the recognition of allergic manifestations in the nose. For purposes of clearness, these may be considered under the headings of clinical history, rhinoscopic examination, eosinophilia in the nasal secretions, and cutaneous tests.

History.—There is no disease group in which a detailed history is more essential, and there are few histories more difficult for the uninitiated to obtain. It is necessary to go into every ramification of the patient's life, activities, and surroundings. The family history must be searched for the presence of manifestations of hypersensitivity in antecedents, for a positive family history occurs in 60 per cent of clinically hypersensitive patients, whereas it is present in only seven per cent of the general population.⁷ Hence the presence of seasonal or perennial hay fever or other allergic manifestations in the parents, grandparents, uncles, or aunts always suggests the probability that the presenting nasal symptoms are allergic.

The diagnosis of seasonal hay fever is usually not difficult if, in addition to an allergic history, the patient has seasonal attacks attended by coryza, lachrymation, itching of the eyes and nose, sneezing and nasal obstruction. When, however, the same condition occurs as a perennial disease, the diagnosis is frequently mistaken for an infective type of coryza, and many surgical procedures may be undertaken in an effort to give the patient relief.

Rhinoscopic Examination.—The appearance of the nasal mucosa in patients showing allergic nasal reactions has been well described by Coates⁴ and more recently by Hansel.⁶ These observers emphasize the bilateral character of the pathologic changes and the variations in the appearance, depending upon the severity and frequency of the attacks and the duration of the disease. In the early cases the mucous membrane is pinkish gray in color, and so markedly edematous and boggy that nasal breathing is completely obstructed. In patients having typical seasonal hay fever, the symptoms do not last long enough to produce permanent changes in the mucous membrane. In consequence, during the inactive stage, the nasal membrane, except for discoloration, may appear normal. Patients with symptoms throughout the year, however, show striking pathologic changes in the mucous membranes. Due to the generalized hyperplasia of the epithelium the membrane takes on a pale gray color. This change has been noted more especially over the anterior tips and lower margins of the middle turbinates and in the anterior ethmoidal regions. The hyperplasia of the epithelium and the edema of the submucosa over a long period of time give rise to the polypoid degeneration so frequently noted in these conditions. The mucous membranes of the eth-

moid and maxillary sinuses may show pathologic changes similar to those observed in the nasal membranes.

Eosinophilia in the Nasal Secretions.—The eosinophilic reaction is generally recognized as an important phenomenon of allergy. A blood eosinophilia is not an uncommon although by no means an invariable finding in these patients. In a recent study of three hundred and forty-six patients, Brown⁸ found an average of seven per cent eosinophils in the blood of patients with perennial hay fever due to protein sensitization. In addition to their increase in the blood, eosinophils occur in large numbers in the tissues, sputum, and nasal secretions of allergic patients. Eosinophilic infiltration has been found postmortem in the bronchial walls and, as has already been pointed out, it is a characteristic of the submucosal tissues removed from the nose and sinuses of patients manifesting allergic symptoms. Recently Eyer mann⁹ called attention to the diagnostic significance of an eosinophilia in the nasal secretions. He regards it as one of the most striking features of nasal allergy, just as an eosinophilia is an outstanding characteristic of the bronchial secretions in allergic asthma. In a study of the nasal secretions of ninety-one patients with various conditions of the nose, Eyer mann found eosinophils present in 72 per cent of those showing nasal allergic reactions as compared with only nine per cent in the nonallergic group. This finding is in keeping with the histopathologic studies already presented. A cytologic examination of the nasal secretions for eosinophilia may, therefore, serve as another diagnostic aid in the differentiation of obscure instances of nasal allergy from other nasal conditions.

Cutaneous Tests.—Much has been written in recent years concerning the dependability of skin tests in the diagnosis of allergic diseases. Whereas such tests are only one link in the diagnostic chain, one must nevertheless regard them as indispensable, more particularly in the study of the patient with seasonal or perennial hay fever. In these patients skin tests are a very reliable guide as to causative protein inhalants responsible for the nasal symptoms, and fortunately in this group the percentage of positive tests obtained is very high. It is therefore important for the physician who expects to study many patients with nasal allergy to have in his possession suitable preparations of practically all the substances that are known to sensitize the nasal membranes. He must be willing to spend the time and he must have the patience to test and retest his cases because frequently many and repeated tests are required before the cause or causes underlying a given instance of nasal allergy are successfully determined.

Skin tests are particularly reliable in the diagnosis of allergic manifestations in children, and in them the cause of nasal and sinus symptoms may frequently be determined by this method of study. Because of the tendency to overlook pro-

tein sensitization as a possible cause of chronic sinus disease in children, the suggestion has been made that the allergic factor be assumed until it has been definitely excluded.¹⁰

Too much, however, must not be expected from the skin test. It has definite limitations in diagnosis. There is an impression, far too common, that if the reactivity of the skin indicates the presence of an allergic condition, failure to obtain a positive reaction rules out the existence of protein hypersensitiveness. This is a conception far from the truth and one that has led to much discredit of the skin test as a diagnostic procedure. A reliable history, an expert rhinologic examination, and clinical tests must still constitute the basic data for an etiologic diagnosis of nasal allergy.

THE TREATMENT OF ALLERGIC SINUS DISEASE

The best results in the prevention and treatment of nasal sinus disease of allergic origin can be achieved only by the close cooperation of the rhinologist and the internist devoting his time to the study of allergic diseases. The proper therapeutic course to pursue in each patient depends largely upon the degree to which nasal allergic symptoms are complicated by nasal lesions and infection. Judging from recent rhinologic literature, it would appear that most rhinologists agree that uncomplicated seasonal and perennial hay fever are nonsurgical conditions. Coates⁴ has summarized in a concise way the therapeutic problem in this group of allergic patients: "In no case where protein sensitization can be demonstrated should dependence be placed on nasal surgery. Where this is done, good results will rarely be obtained, and for this reason surgery for such cases falls into disrepute. Allergic treatment should first be instituted and carried out."

The results of desensitization in this group of allergic patients vary somewhat with the methods of treatment employed by different workers. That the results of the specific therapy of hay fever are gradually improving would appear from almost every recent paper on this subject. An excellent summary of the present status of the hay fever problem has been published by Feinberg.¹¹ Vander Veer, Cooke, and Spain,¹² Bernton¹³ and Piness¹⁴ report some degree of symptomatic relief in from 75 to 94 per cent of all hay fever patients. Walker,¹⁵ a pioneer worker in this field, has recently analyzed a series of one hundred of "apparently cured" hay fever patients. He defines the word "cure" as freedom from symptoms for two or more years without treatment, the average duration of specific therapy having been three and a half years. It is doubtful whether it is justifiable to apply the term "cure" to an ailment in which hereditary predisposition plays so important a part. Certain it is, however, that improvement in methods of treatment and the elimination of other causes of failure will increase the number of instances of more complete and lasting relief.

An important therapeutic advance is the growing tendency to supplement the preseasonal and

coseasonal treatment of the hay fever patient with desensitization throughout the year. In our hands, perennial treatment promises to give the most permanent relief. The method employed by us is briefly the following: Patients who are multiply sensitive to the spring or fall pollens are treated simultaneously with two or more extracts, the dose of each extract being given separately in different sites in the arm. Before the pollinating season, the dose may be increased quite rapidly at biweekly intervals; during the season the frequency of injections is increased to triweekly intervals, but the dosage is kept below an amount likely to cause a strong local or a constitutional reaction. Between seasons the dose of extract is again increased to as high a point as possible, and this dosage may be continued at fortnightly intervals throughout the year. In instances of perennial hay fever resulting from multiple sensitization to pollen and other biologically unrelated allergens, treatment is carried out at the same time both with pollen extracts and those made of the other protein offenders. Desensitization with animal epidermal extracts and various miscellaneous substances, such as orris root, silk, cotton and other components of environmental dusts, is undertaken only if it is clear that elimination therapy alone will be ineffective.

The frequent association of nasal allergic manifestations with nasal anomalies and infection has already been stressed. To obtain the best results in these patients, a combination of desensitization and local surgical measures may be essential. This aspect of the subject has been discussed in previous papers.^{16 17} Regardless of whether a nasal anomaly or a focus in the nose or sinus is directly secondary to the allergic manifestations or is coincidental, if drainage is interfered with, good judgment demands its correction. Many rhinologists report good results, particularly in the perennial hay fever patient, following appropriate local surgical measures. If the faulty mechanical condition of the nose is the result of obstruction from a turgescent, allergic mucous membrane, local shrinkage of the membrane frequently gives immediate relief while awaiting the more permanent relief from specific treatment. In the event proper ventilation and drainage of the nose still continues defective after a course of desensitization, corrective surgical measures are justifiable. It is at times difficult when allergy and nasal anomalies and infections are all present to decide which form of treatment to employ first. The proper therapeutic sequence can only be determined by a study of the individual patient.

Finally it should be emphasized that no therapeutic regimen in patients with chronic sinus disease is complete unless it includes those general measures which are likely to improve the vitality and resistance of the respiratory mucous membranes. Those agents which seem to give the greatest promise in this direction are a vitamin-containing diet, cod-liver oil, sunshine and calcium therapy.

The exact mechanism underlying desensitization of a hypersensitive patient is little under-

stood. It may be assumed that in some way the permeability of the cells lining the mucous membranes of the body is lessened, so that they no longer react unfavorably to certain protein substances, contact with which had heretofore given rise to an allergic reaction. That this inherited vulnerability and irritability of the mucous membranes in allergic patients may also be modified by the general measures mentioned appears very likely. The value of diets rich in vitamin A as an aid to improvement in the resistance of the sinus membranes to infection is supported by some good experimental work. In 1923, Daniels and her co-workers¹⁸ showed that a diet deficient in fat soluble vitamin A, found abundantly in butter fat and cod-liver oil, may predispose to the development of sinus infection in the experimental animal. Barlow also noted¹⁹ that a diet in which Vitamin A is deficient gives rise in animals to marked changes in the mucosa of the respiratory tract, edema and small cell infiltration, resulting in rhinitis, sneezing, and wheezing—symptoms all of which suggest an allergic nasal reaction. Although similar studies on the influence of nutrition on the allergic responses in man are not available, it is reasonable to infer that an allergic mucous membrane may be rendered less reactive by a diet rich in vitamin A.

To a diet rich in vitamins, and more particularly in vitamin A, sunshine, natural or artificial, cod-liver oil and calcium are important adjuvants. The employment of calcium in patients with allergic manifestations has been considered valuable by some and useless by others. Because of its antagonistic action to sodium and potassium, calcium has the property of diminishing neurocellular hyperexcitability and of decreasing the permeability of cell membranes. This difference of opinion as regards the therapeutic value of calcium may have resulted from a failure to insure its absorption in adequate amounts. Recent studies show that calcium absorption is influenced by the acid-base values of the diet, the amount of fat, the addition of cod-liver oil (vitamin D) and the amount of exposure to ultra-violet light.

According to the work of Kahn and Roe,²⁰ the optimum oral dose of calcium lactate is five grams, taken on an empty stomach. This dose is to be taken twice daily, about one-half hour before breakfast and dinner. Children are given about one-half of this amount three times a day before meals.

In the prevention of allergic nasal reactions the general therapeutic measures discussed should prove to be even of greater value since clinical experience has shown that many patients with an allergic constitution may remain symptom-free for many years, even though exposed to substances to which their mucous membranes are sensitive, until the allergic balance is upset by undernutrition, fatigue, or infection. Any measures, therefore, undertaken to increase the vitality of the respiratory mucous membranes in these patients should help to lessen the incidence of chronic nasal sinus disease among them.

SUMMARY AND CONCLUSIONS

1. The mucous membranes of the nose and sinuses are constantly exposed to sensitization with numerous air-borne sensitizing substances. The existence of an inherited predisposition to develop sensitization in over half of the population has made the incidence of allergic manifestations of the nose and sinuses very large.

2. Sensitization of the nasal mucous membranes is a very important predisposing cause in the development of chronic nasal sinus disease. The recognition of sinus disease of allergic origin is based upon clinical and histopathologic evidence.

3. The diagnosis of allergic sinus disease can be made from the clinical history, rhinoscopic examination, demonstration of eosinophilia in the nasal secretions and cutaneous tests.

4. The successful treatment of allergic sinus disease depends upon the success which attends the treatment of the nasal allergic manifestations. Instances of nasal allergy complicated by secondary infection may require local surgical measures. In these patients the best results are achieved by the coöperation of the rhinologist and allergist.

5. Every available general measure which helps to improve the vitality of the respiratory mucous membrane and to lessen cellular permeability should be employed in the prevention and treatment of sinus disease of allergic origin. These should include a high vitamin-containing diet, cod-liver oil, sunshine, and calcium.

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DISCUSSION

WILLIAM PALMER LUCAS, M.D. (490 Post Street, San Francisco).—Doctor Hurwitz' paper interests me very much from the standpoint of an allergic condition associated with sinus infection. There is no question but that the two conditions have an intimate relationship with each other. It is often difficult to say which one is the predominating factor. To give good results, one must treat the individual from an allergic standpoint and also from the standpoint of a sinus infection. We have found that internal glandular derangement conditions are also closely associated with sinus infection. We have quite a large series of cases in which repeated sinus infections are not successfully handled until their metabolic condition is corrected. In some of these cases this may be due to a hypothyroid condition or a hyperthyroid condition. The important point is that the individual must be studied from every point of view where there is a chronic sinus infection.

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J. A. BACHER, M.D. (Stanford University Hospital San Francisco).—Doctor Hurwitz has been very fair as to the relative importance of infection and of allergic factors in sinus disease. There are two causes of discharge from the nose. First: sinus infection, acute or chronic. In the chronic case sometimes no discharge is present except after very careful study. Second: mechanical, chemical or allergic irritation. Polypi are nearly always caused by purulent discharge which irritates the mucous membrane and leads to its hypertrophy. Polypi may rarely be caused by mechanical or chemical irritation. It is questionable whether the edema that may accompany an allergic state can cause polypi without the factor of discharge. Hirsch reported a case of polyp springing from the antrum in a case that he had known for years, to be atrophic rhinitis. Upon opening the antrum, a polyp was found springing from its posterior-inferior wall, with a small pedicle passing through the antral ostium, the body of the polyp hanging over the inferior turbinate. Hirsch does not believe that a purulent condition is necessary for polyp formation. He thinks that a small edematous mass of mucosa in a catarrhal sinusitis becomes incarcerated in the ostium, pinched off in the middle meatus and forms a polyp. Hirsch states that a third of forty-two cases of polypi showed only catarrhal inflammation. Catarrhal inflammation as used by Hirsch presumes discharge, watery in its presenting characteristics. I have always felt that polypi meant purulent sinusitis. When a patient has discharge from the nose and it is watery in character and contains a few mononuclear leukocytes and has an allergic history, we may have a sinusitis—that is, allergic irritation of the sinus lining associated with discharge into and from the sinus. Then there is the case where there is scanty, watery discharge, with negative x-ray and negative allergic history and findings. It is then probable that the discharge comes from a sinus, and most difficult to tell whether or not there is an allergic factor. It remains to be seen whether allergic therapy can cure cases of sinusitis with frank pus and polyp. I think Doctor Hurwitz has given a fair outline of the treatment of such cases.